

Memorandum

To: Meredith Tomczyk, Township Manager/Clerk

From: Michael Angelastro, Ph. D., PE, PTOE

Re: **Route 73 Analysis - DRAFT**
Mount Laurel Township, Burlington County

Date: July 23, 2019

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This report will provide a brief overview of the operational characteristics of the adjacent signalized intersection and roadways since the opening of the Walmart Store along Route 73 adjacent to Fellowship Road and Beaver Lane (see location map).

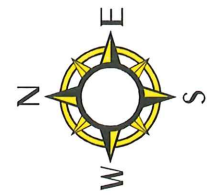
Existing Conditions

New Jersey State Highway Route 73 is an urban principal arterial under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and generally consists of three (3) lanes in each direction. The average daily traffic is approximately 72,000 vehicles per day. The posted speed limit along Route 73 is 50 miles per hour (mph). For the purpose of this analysis, Route 73 will assume to have an east/west orientation.

Fellowship Road (County Route 673) is an urban minor arterial under the jurisdiction of Burlington County and generally consists of two (2) travel lanes in each direction. The average daily traffic is approximately 22,000 vehicles per day. The posted speed limit along Fellowship Road is 40 miles per hour (mph). For the purpose of this analysis, Fellowship Road will assume to have a north/south orientation.

Beaver Avenue is a local roadway under the jurisdiction of Mount Laurel Township and consists of one (1) travel lane in each direction. The average daily traffic is approximately 1,700 vehicles per day. For the purpose of this analysis, Beaver Avenue will assume to have a north/south orientation. The posted speed limit along Beaver Avenue is 25 miles per hour (mph).

Intersection of Route 73 & Fellowship Road is under the jurisdiction of the NJDOT and vehicular movements are controlled via traffic control signal.



Walmart Site
 Mount Laurel Township, Burlington County, New Jersey
 July 25, 2019

Background

In support of the Walmart Development application, the applicant's professional prepared a traffic impact statement. The traffic report, entitled *Traffic Impact Study for the Proposed Walmart Development* was prepared by McMahon Associates, Inc. and dated August 2012. This study was reviewed and approved by the Mount Township Traffic Engineer (Litwornia Associates), Burlington County and the New Jersey Department of Transportation (NJDOT). The traffic study evaluated various intersections surrounding the site to establish the potential traffic impact associated with the development and propose improvements to mitigate the expected traffic impact.

The traffic study relied on standard methodologies when preparing the traffic study in support of the Walmart Development which consists obtaining traffic data, analyzing the study locations with the Highway Capacity Software (HCS), applying the expected additional site trips associated with the project, analyzing the study locations with the additional traffic, and recommending mitigation measures to reduce the traffic impact on the study location.

Please note in order to evaluate the effectiveness of the mitigation measure, a travel time and delay study needs to be conducted in the existing conditions (before project is built) and again in the build conditions to determine if driver travel time and delay through the study locations changes. A travel time study determines the amount of time required to travel from one point to another on a given route. Other information may also be collected on the locations, durations, and causes of delay. In this case a travel time study would be completed along the site frontage at Route 73 and through the signalized intersection of Route 73 & Fellowship Road. An additional travel time study should have been conducted along Fellowship Road

If the travel time data is not collected in the existing conditions, then this type of analysis cannot be performed in existing conditions, as there are "before" travel times to be compared to the build (after) travel times. In absence of this travel time analysis, we must rely on the original HCS analysis in the before and after conditions.

For the purpose of this analysis, we will review the existing and expected conditions at the following locations as depicted in the original traffic impact study conducted for the Walmart Development:

- Intersection of Route 73 & Fellowship Road
- Fellowship Road
- Beaver Avenue & Church Road

Analysis

To evaluate the operation of the study intersections, a capacity analysis was performed using the Highway Capacity Software (HCS) methodology. The capacity analysis procedure is used to estimate the ability of roadways and intersections to accommodate the existing and future traffic volumes. Level of Service (LOS) is the measure of the quality of the traffic operation and describes the operational characteristics of the facility. Levels of service are defined for each type of facility

(signalized intersection, unsignalized intersection, roadway segment, etc.). These levels of service range from LOS A to LOS F, with a LOS A representing the best operating condition and LOS F representing the worst operating conditions.

The level of service for an unsignalized intersection is determined based on the average control delay. The delay is associated with each stop-controlled movement from the minor approaches and yielding left-turn movements from a major road. The level of service criteria for an unsignalized intersection is provided in Table 1.

Table 1. Level of Service Criteria for Unsignalized Intersections

Level of Service	Delay (sec)
A	0 - 10
B	$>10 - \leq 15$
C	$>15 - \leq 25$
D	$>25 - \leq 35$
E	$>35 - \leq 50$
F	>50

Additionally, the level of service for a signalized intersection is determined by vehicular delay, which can measure a driver's discomfort and frustration, fuel consumption and lost travel time. The delay experienced by the motorist depends on many factors such as traffic volume, geometrics, signal timing and volume-to-capacity ratio. The level of service criteria for signalized intersections is shown in Table 2.

Table 2. Level of Service Criteria for Signalized Intersections

Level of Service	Delay (sec)
A	≤ 10
B	$> 10 - \leq 20$
C	$>20 - \leq 35$
D	$>35 - \leq 55$
E	$>55 - \leq 80$
F	>80

Please note that we are reviewing the analysis that was conducted with 2011 traffic volumes data and based upon NJDOT traffic growth projections, (the NJDOT expects traffic to increase 1.0% yearly for Route 73 and Fellowship Road.) Therefore, the levels of service will continue to decrease yearly as traffic volumes even increase if no other traffic mitigation measures are implemented.

Intersection of Route 73 & Fellowship Road

Intersection of Route 73 & Fellowship Road was evaluated in 2012 in support of the Walmart Development. The traffic counts were conducted at this intersection and a level of service analysis was performed existing (before) and in the build (after) condition. Based upon the information in the original traffic report (2011), Table 3 indicates the existing level of service at the Route 73 & Fellowship Road in 2011.

Table 3. Existing Levels of Service (2011)
Route 73 & Fellowship Road

Intersection Approach	Movement	AM Peak	PM Peak	Saturday Peak
Westbound Route 73	Left	F	F	F
	Thorough/Right	F	F	C
Eastbound Route 73	Thorough	F	F	F
	Through(jughandle)/Right	F	F	C
Northbound Fellowship Road	Left	F	F	E
	Thorough/Right	F	E	D
Southbound Fellowship Road	Left	F	F	F
	Thorough	D	D	D
	Right	E	D	F

* Traffic Impact Study for the Proposed Walmart Development prepared by McMahon Associates, Inc. dated August 2012

Based upon the McMahon traffic report, the following table indicates the levels of service at the intersection of Route 73 & Fellowship Road in the Build year, 2013.

Table 4. Build Levels of Service (2013)
Route 73 & Fellowship Road

Intersection Approach	Movement	AM Peak	PM Peak	Saturday Peak
Westbound Route 73	Left	F	F	F
	Thorough/Right	F	F	C
Eastbound Route 73	Thorough	E	F	D
	Through(jughandle)	D	E	C
	Right	C	C	B
Northbound Fellowship Road	Left	D	F	E
	Thorough	F	F	E
	Right	D	D	D
Southbound Fellowship Road	Left	D	D	E
	Thorough	F	F	F
	Right	F	F	F

* Traffic Impact Study for the Proposed Walmart Development prepared by McMahon Associates, Inc. dated August 2012

With the constructed improvements, the levels of service of some movements were expected to improve while level of service of other movements were expected to worsen. The intersection modifications provided marginal improvements in the level of service however, these improvements in the level of service are likely not perceivable by the average motorist using this intersection. Additionally, with the background growth of traffic volumes that has taken place since 2013, it is likely the levels of service at the intersection have decreased from what was indicated in the traffic report for the Walmart Development.

The only way to increase capacity of a roadway section or an intersection is to add additional travel and turning lanes. While the roadway improvements associated with the Walmart project were extensive, they were not enough to significantly improve the overall operation of the intersection of Route 73 & Fellowship Road. The proposed improvements along Route 73, currently in the design phase will add travel lanes, and remove turning movements from this intersection. Therefore, these improvements are expected to improve the overall operation of the intersection of Route 73 & Fellowship Road.

This office contacted the Mount Laurel Police Department to determine number of crashes that have occurred at the intersection of Fellowship Road & Route 73 to establish if the intersection reduced crashes at this location. The Walmart Store opened in October 2018, so we obtained the number of crashes at the intersection for the years 2016, 2017 and from October 2018 to present (July 2019). Table 5 summarizes the crash data at this intersection for the analysis period.

Table 5 – Crashes Intersection Route 73 & Fellowship Road

Location	2016	2017	October 2018 to Present
Intersection of Route 73 & Fellowship Road	74	66	28

If the number of crashes from October 2018 to present are extrapolated to a 12-month period, we expect 35 crashes at this intersection between October 2018 to October 2019. Based upon the crash data it appears the number of crashes will be reduced in the 12-month period following the completion of the improvements at the intersection of Route 73 & Fellowship Road. Please note additional years of data will be required to determine if this apparent trend will continue.

Fellowship Road

The primary improvements constructed along Fellowship Road consisted of installation of traffic control signals at intersections of Fellowship Road & Walmart Driveway/Century Parkway and at the intersection of Fellowship Road & LifeTime Fitness Driveway/Century Parkway.

Traffic control signals offer the maximum degree of control at intersections. The primary function of a traffic signal is to assign right of way to conflicting movements of traffic at an intersection, and it does this by permitting conflicting streams of traffic to share the same intersection by means of time separation. By alternately assigning right of way to various traffic movements, signals provide for the orderly movement of conflicting flows. They may interrupt extremely heavy flows to permit the crossing of minor movements that could not otherwise move safely through the intersection.

When properly timed, traffic signals increase the traffic handling capacity of an intersection, and when installed under conditions that justify its use, it is a valuable device for improving the safety and efficiency of both pedestrian and vehicular traffic. In particular, signals may reduce certain types of accidents, most notably the angle (broadside) collision. Although, traffic control signals can reduce the number of angle collisions at an intersection, traffic signals can also cause an increase in other types of accidents. For example, it has been well documented that other types of accidents, notably rear-end collisions, usually increase when a traffic control signal is installed.

The travel time along Fellowship Road likely increased as a result of the traffic control signals. Before the project, vehicles were able to travel from Church Road to Route 73 without stopping whereas under current conditions, vehicles are required to stop at the newly installed traffic control signal. The traffic signals are metering the traffic flow along Fellowship Road, allowing platooning of vehicles to arrive at the next traffic signal.

While improving movements for the side streets and driveways, the traffic control signal along Fellowship Road increase travel time and delays for motorist traveling along this roadway.

Church Road & Beaver Avenue

The intersection of Church Road and Beaver Avenue was analyzed as part of the Walmart Development. Traffic counts were conducted by McMahon Associates, Inc., in September/October 2011 (see attached) and the traffic counts were conducted by Shropshire Associates, LLC, in March 2019 (see attached). The traffic volumes are shown in Figure 1.

Based on the traffic information the 2019 AM and PM peak hour traffic volumes have **decreased** from traffic volumes collected in September/October 2011. It is generally accepted that the average daily traffic (ADT) volumes along a roadway are generally 10% of the either the AM or PM peak hour traffic volumes. Therefore Table 6 indicates the average daily traffic volumes along Beaver Avenue in 2011 and in 2019:

Table 6 – Beaver Avenue: Average Daily Traffic Volumes

	Average Daily Traffic Volumes	
	2011	2019
Beaver Avenue	2,030 vehicles	1,710 vehicles

Based upon the traffic data, it appears that there are **less vehicles** traveling along Beaver Avenue in March 2019 than were traveling along this roadway in September/October 2011. Therefore, we do not feel the Beaver Avenue was adversely impacted as a result the Walmart Development and other projects in the area.

Conclusions

While the proposed improvements helped maintain the flow of traffic through the study area, it is apparent the levels of service in at the intersection of Route 73 & Fellowship Road and along Fellowship Road **have not improved.** The operational characteristics along Route 73 will improve with the construction of the corridor wide improvements proposed by the NJDOT. These improvements are expected to be completed sometime in 2026.

Beaver Avenue has experienced a decrease in traffic from September/October 2011 to March 2019. Beaver Avenue does not appear to have adversely impacted as a result the Walmart Development and other projects in the area.

If you have any questions regarding this matter, please contact our office.

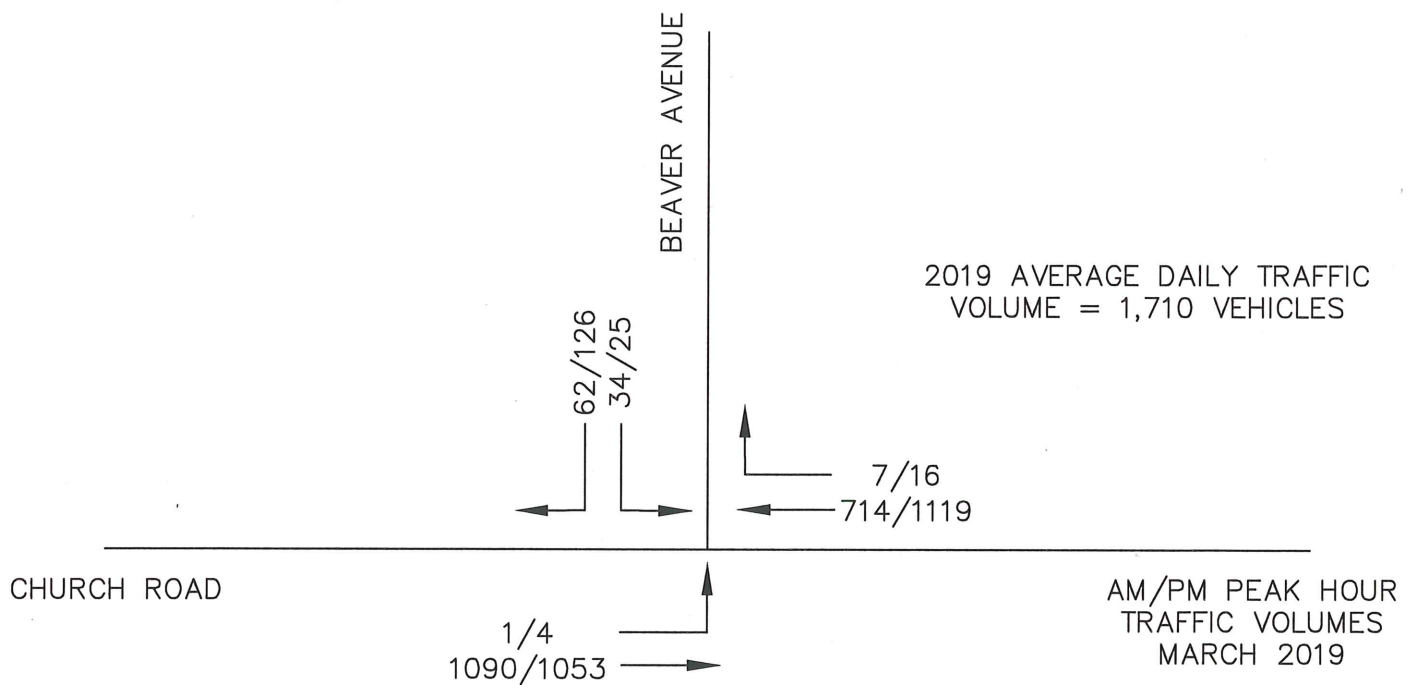
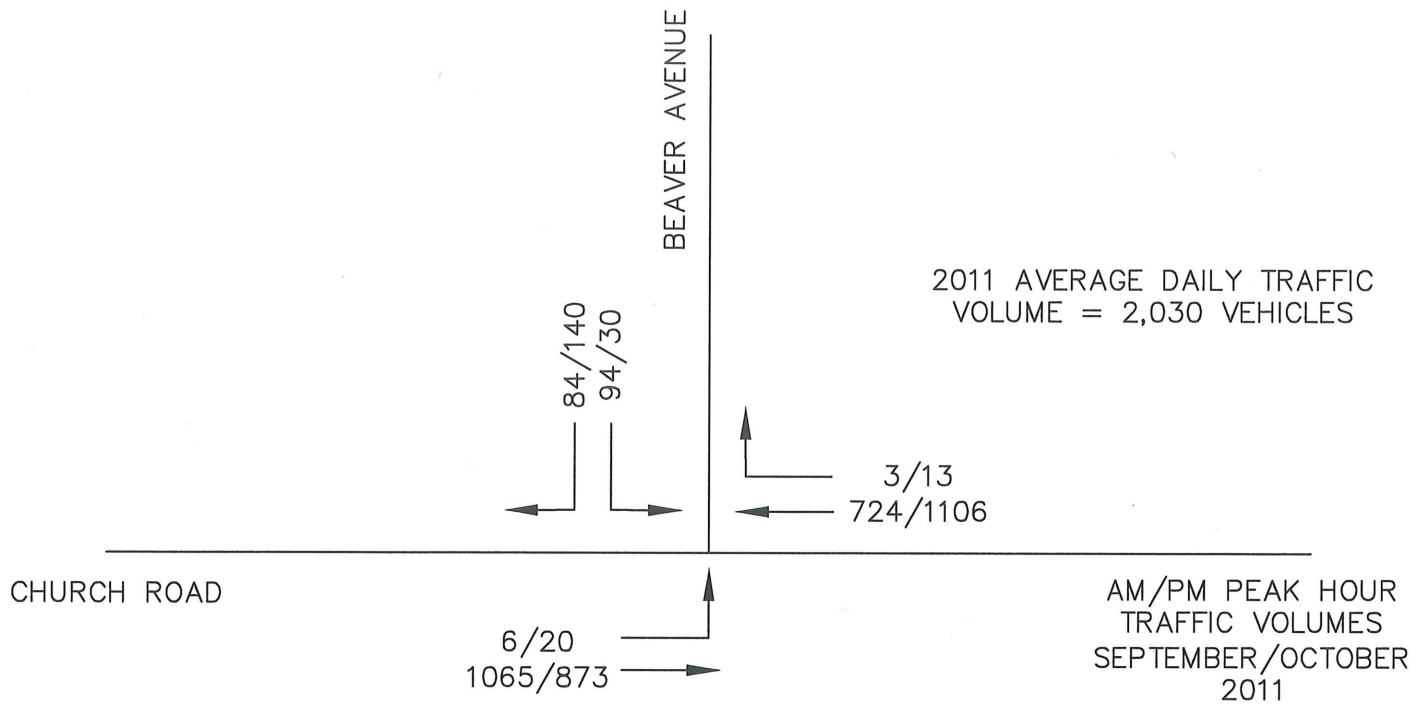


FIGURE 1
2011 & 2019 TRAFFIC VOLUMES
CHURCH ROAD & BEAVER AVENUE
MOUNT LAUREL TOWNSHIP, BURLINGTON COUNTY



REMINGTON & VERNICK ENGINEERS

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Certificate of Authorization: 24 GA 28003300

~ENGINEERING EXCELLENCE~

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